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IMPLICATIONS FOR SMALL FARMERS OF PORTUGAL'S ENTRY INTO THE EC

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ABSTRACT

Portuguese farmers face price declines for several major enterprises because of the country's entrance into the European Economic Community (EC). The small farmers in northwestern Portugal face some of the biggest adjustments. Price projections suggest that 1996 prices for their key enterprises may fall 15 to 30 percent below current levels, and their net farm income may decline from 10 to 250 percent. Medium and large dairy farms will not be able to cover the fixed costs of the investments they were encouraged to make in recent years. Simulations of alternative scenarios were conducted for four farming systems in the region. The smallest farms are least affected by the projected price declines because much of their income is earned off the farm. Known technological improvements for existing enterprises, if adopted, would be adequate to recover the income lost on large farms. Medium farms face the greatest challenge. They cannot achieve the scale of large farms, and cannot earn as much off-farm income as small farms. Their future success will depend on the operation of the land market, and their ability to rent or buy more land.

Biographical Sketch

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IMPLICATIONS FOR SMALL FARMERS OF PORTUGAL'S ENTRY INTO THE EC

INTRODUCTION

Portugal became a member of the European Economic Community (EC) on January 1, 1986. Although membership is expected to produce positive long-term gains for the economy as a whole (Cravinho), the agricultural sector will experience a significant challenge because of the changes required to bring Portugal's commodity prices into alignment with the rest of the community. Portuguese agriculture has benefited from subsidized production inputs and policies that maintained many commodity prices above world and EC prices. Most input subsidies were eliminated during the past few years, but prices paid to farmers are still relatively high. Furthermore, many EC prices are high compared to the rest of the world and future trade negotiations may succeed in lowering them which would imply that Portuguese prices would have to fall even further. Portugal was granted a ten-year adjustment period during which time it has an opportunity to assist farmers in their adjustments to future conditions. Moreover, the EC has provided a large amount of funds to help the country prepare for the new policy regime it will face.

Adjustments to EC price levels will be particularly difficult in northwest Portugal, a region dominated by small and poor farms. Recent studies suggest that many farming systems in the region will experience reduced private profitability with EC prices (Carvalho et al.; Finan; Finan and Fox). To date, however, no one has modeled typical farming systems with projected prices, and systematically tested alternative ways to restore the farm income lost by price declines. The purpose of the study summarized here was to analyze the impact of alternative farm level adjustments that might be undertaken in the northwest

to compensate for lower commodity prices. The study consisted of two main parts. The first involved detailed price projections for major commodities based on the terms available to Portugal in the transition period (Avillez et al.). The second involved development of farm level models representing major farming systems to analyze the impact of the projected commodity price changes, and the alternative scenarios simulated to recover the farm income lost due to lower prices (Henriques).

AGRICULTURE IN NORTHWEST PORTUGAL

Agriculture in Portugal suffers from low productivity compared to the average yields of countries already in the EC (Table 1). Yields of major cereals range from 16 to 58 percent of EC averages. Rice is the only cereal crop in which Portuguese yields begin to approach those of the EC. The same is true for many other major farm commodities with the exception of tomatoes where Portuguese yields appear to be competitive. The low levels of productivity are related to low levels of input use (Table 1). Portuguese fertilizer use is roughly 20 to 50 percent of EC levels and tractor use is less than half that of the EC.

Low agricultural productivity poses a problem for the country as a whole as it enters the EC, but the problem is particularly difficult for farmers in the northwest because of their small size farms and limited potential for expansion. They already earn substantially less income than farmers in other regions. Therefore, the Entre Douro e Minho region in northwest Portugal was selected as the study area for this research. It contains about 425,000 hectares in farms and produces 13 percent of the national agricultural GNP. The region consists of a narrow coastal plain in the west, a central

Table 1

Comparative Yields and Input Use
Europe Ten and Portugal

Item		Units	Europe	Portugal	Percent
Yields:					
Durum Wheat		100 kg/ha.	21.7	12.5	58
Corn		100 kg/ha.	66.3	13.0	20
Barley		100 kg/ha.	45.7	10.3	23
Rye		100 kg/ha.	36.1	5.6	16
Rice		100 kg/ha.	55.0	37.9	69
Sunflower		100 kg/ha.	19.0	6.4	34
Olives for oil		100 kg/ha.	27.6	10.6	38
Tobacco		100 kg/ha.	18.0	10.0	56
Potatoes		100 kg/ha.	268.0	78.9	29
Tomatoes		100 kg/ha.	447.6	432.8	97
Oranges, mandarins		100 kg/ha.	182.0	50.7	28
Almonds		100 kg/ha.	9.0	3.9	43
Wine grapes		hl/ha	67.1	36.1	54
Dairy cows		kg/head	4,258	2,433	57
Inputs:					
Fertilizer	N	kg/ha.	74	34	46
	P_2O_5	kg/ha.	41	18	44
	K_2O	kg/ha.	41	9	22
Tractors		per 100 ha. utilized ag. area	4.9	1.9	39

Source: European Community Commission, "Agricultural Aspects of Community Enlargement to Include Portugal and Spain," Green Europe, Newsletter on the Common Agricultural Policy, No. 214, No.1, 1986, Brussells.

transitional zone with increasing altitude, and in the east a mountainous area with terraces and high valley agriculture. Much of the agricultural land is irrigated. An average size farm in the region in 1980 earned only about one-half of the national average farm income.

Farms are small, averaging about 2.3 hectares and are typically composed of several parcels. The very small (less than 3 hectares) and small (3-5 hectares) farms together represent 94 percent of the farms but only one-half of the total farm area. Large farms (over 50 hectares) account for only 0.5 percent of the farms, but almost one-quarter of the area. The very small and small farms produce about three-quarters of the region's livestock and crop GDP, and 30 percent of the forestry products. Wine, vegetable crops, beef, potatoes, corn and milk, in that order, are the region's most important farm commodities. The very small and small farms produce between 70 and 90 percent of the total production of these commodities.

Dairying is particularly important as the region produced almost 30 percent of the nation's raw milk in 1981. Most producers have less than 10 cows and half of the farms have a daily production of less than 10 liters (Carvalho et al.). Most farms have small vineyards with fewer than 0.5 hectares and produce less than 5,000 liters of wine annually (Finan et al.). Like wine, potatoes are usually grown on small plots largely for home consumption.

The region's farming systems employ traditional technology, especially on the small farms. Most farm labor is provided by the wife because many males have off-farm employment. Power and specialized machinery ownership is generally limited to larger farms which frequently provide custom hiring services for small farms. Milk is often produced by traditional breeds of cows

that are also used as work animals. Many small farms do not have modern dairy facilities so milking is often done in cooperative milking parlors. Although regional crop yields are fairly high by Portuguese standards, they range from a low of about one-third of EC levels for oats and rye to 85 percent for corn. Milk production per cow is about three-quarters of the EC average. Wine production per hectare, on the other hand, is higher than the EC but there are doubts about the competitiveness of Portuguese wines in the EC market[1]. There may be good export prospects for Portuguese fruits and vegetables but many are produced outside this region and these markets have yet to be developed.

THE EC AND FUTURE PORTUGUESE PRICES

Portugal was granted a ten-year transitional entry period in the EC. This transition period was provided to help facilitate two types of adjustments considered necessary with the enlargement of the EC to include Spain and Portugal (European Community Commission). One is the sudden confrontation that the more vulnerable sectors of Portuguese agriculture would have faced with the unrestricted production of the other more productive states. The second was the need to temper any damage to third countries in the Mediterranean area caused by EC preference for Portuguese and Spanish products. The transition rules specify the types and speed of adjustment that Portugal must follow so it is fully aligned with EC policies at the end of the transition period (Varela).

The future profitability of farm enterprises and, consequently, the level of farm income in northwest Portugal will depend on two factors. One factor will be the changes in factor and product prices that will occur as Portugal adopts the Common Agricultural Policy (CAP). The second will be the impact on Portuguese agriculture of the structural policies implemented with domestic and

EC funds. These include improved markets, rural roads and electricity, professional training and subsidization of long-term investments.

The evolution in future Portuguese farm product prices will be determined by four factors. The first factor will be the procedure used to harmonize Portuguese institutional prices with the EC. The process depends on the length of the transition period applicable for specific commodities (maximum of ten years), the initial price level at the date of accession, and the alternative adjustment strategies available to Portugal. Second, EC prices will change with the evolution in world prices and possible internal and Gatt inspired reforms in the CAP. Third, Portuguese prices will be determined by the evolution of the "Green Rate"[2] reflecting exchange rate policies of Portugal and the EC. Fourth, agricultural markets will evolve between Portugal and its trading partners, in and out of the EC, because of the gradual opening to external markets and Portuguese integration into the mechanisms regulating EC Common Market Organizations.

Future factor prices, on the other hand, will be affected by EC limitations on farm subsidies and by the expected competition from imported inputs entering Portugal as it opens its markets. Primary goods prices will also be affected by the rate of economic growth in Portugal compared to other EC countries, by the expected increase in labor mobility, and by improved access to EC investment funds provided to Portugal.

Considering these factors, models were developed to project future product prices using the following assumptions (Avillez, et al.):

1. Adjusting institutional prices using either a) the terms established in the Accession Treaty or, b) when Portuguese flexibility is

permitted, extrapolating from the trends observed in Portugal's adjustment strategies during the past two years;

2. Average real EC price decreases of 2.5 percent per year until the 1990/91 market year, and 1.5 percent per year thereafter until the end of the transition period;
3. Devaluation of the Green Rate to maintain purchasing power parity in relation to other EC currencies, maintenance of the actual agrimonetary policy, and the adoption of a Green Rate relatively favorable to Portuguese consumers.

The results of the price projections for 1996 (Table 2) show a sharp overall downward trend with variations among commodities that will affect price relationships, future production options and real farm income. Given the greater uncertainty in making input price projections, a simplifying assumption was made to hold them constant, recognizing the bias this produces in favor of enterprises that use fewer purchased inputs.

MODELING ALTERNATIVE SCENARIOS

The modeling component of this study employed a four-step research methodology to analyze policy options: 1) four representative farming systems were identified from survey data (DRAEDM), 2) a linear programming model was developed and validated for each system, 3) optimum solutions were obtained for each model using 1986 and projected 1996 product prices, and 4) alternative scenarios were tested in a comparative static framework as means to compensate for the farm income lost through product price declines. Models for small, medium and large dairy farming systems were developed because of the importance of milk in the region and the major investments the government has encouraged

dairy farmers to make in dairying. The fourth model represented small diversified farms with less dependency on milk[3].

The objective function maximized returns to family labor and management. Four production periods were established to capture observed seasonality in production and input use. Activities were included for production, buying and selling, hiring in and out labor, and interperiod resource transfers. Estimates for home consumption, minimum area for vineyards and potatoes, and fixed costs were based on survey results. Constraints were specified for various types of land, family and hired labor, and machinery hours. Input-output coefficients were obtained from survey and other data.

The income effects of introducing 1996 product prices are shown in Table 3. The values show the percentage decline in household net income for each farming system comparing the optimum model solutions for 1986 prices with the solutions obtained using 1996 prices. Two values are reported. The first shows a decline ranging from 25 to 250 percent when off-farm employment is not permitted. The second shows declines from 11 to 247 percent when it is assumed that unlimited off-farm work is available at the minimal agricultural wage rate. These two approaches capture the range in loss of household income that occurs depending on the success that a particular household has in obtaining off-farm work. The medium and large farms experience negative net farm income because of high levels of fixed costs relative to small farms.

Two important points can be seen from the results in Table 3. First, the relative income declines are greatest for the largest farms because they produce the most and are most affected by product price declines. Off-farm work does not compensate for lower commodity prices because the family labor is fully employed on the farm where returns to labor are highest. Second, small

Table 2

Prices for Agricultural Commodities
in 1986 and 1996

Item	Units	1986	1996	Percent Change
		(Escudos)[a]/		
Beef [b]/	kg	508	431	-15.1
Sheep [b]/	kg	663	572	-13.7
Corn [b]/	kg	41	27	-34.1
Rye [c]/	kg	41	28	-31.7
Beans [d]/	kg	100	100	0.0
Potatoes [d]/	kg	20	20	0.0
Feeder Calf [d]/	calf	25,000	21,200	-15.1
Milk [b]/	liter	45	30	-33.3
White Wine [c]/	liter	36	37	2.7
Red Wine [c]/	liter	33	34	3.0
Brandy [d]/	liter	150	150	0.0

Source: a/ The exchange rate during 1986 averaged 150 escudos = U.S. $1.00.
b Adapted from Avillez, 1987.
c/ Adapted from Tangerman and Josling, 1985.
d/ Values collected in the region.

Table 3

Effect of 1996 Product Prices on Net Farm Income

Farming System	Percent Decline in Income	
	Without Off-Farm Work	With Off-Farm Work[a]/
Small Diversified farms	25	11
Small Dairy Farms	46	33
Medium Dairy Farms	159	107
Large Dairy Farms	252	247

a/ At the prevailing minimum agricultural wage rate.

farms derive a relatively large amount of household income from off-farm work so price declines affect a smaller part of their total income.

Income losses of this large magnitude present a serious challenge for Portuguese policy makers. These farmers are already some of the poorest in the country. Many medium and large farms have received subsidies the past few years to specialize in dairying. Large income declines will make it impossible for them to service their debts, maintain current capital stock and cover fixed costs. The challenge is to identify the alternatives that Portugal can undertake, consistent with CAP regulations, to make the best use of the transition period to ease the adjustment process.

Several simulations were conducted to test policy alternatives and two sets are reported here. One reflects the possible impact of technological changes that may occur in crop and dairy production considering the agronomic alternatives currently available. The second alternative reflects the crucial role of improved off-farm job availability. It is expected that farmers will take advantage of the different alternatives available to them consistent with their resources and capabilities. Technological change, alternative enterprises, more off-farm work and increases in farm size are some of the options available. The first three options are relatively suitable for all farmers in the near future, but there are several structural factors that will impede rapid changes in farm size. The availability of off-farm work will depend on the speed and patterns of development of other sectors of the economy, and the migration policies of other more labor-scarce countries.

The data in Table 4 report the simulation results assuming that 1996 product prices prevail in all cases. The first two columns permit an analysis of the effects of technological change when unlimited off-farm work is

TABLE 4

Alternative Scenarios with 1996 Prices

Farming System	Unlimited Farm Employment		Industrial Employment			
	Without Technology Change	With Technology Change	Without Technology Change		With Technology Change	
			Full Time	Limited Seasonality	Full Time	Limited Seasonality
	Projected Income as a Percent of 1986 Income					
Small Diversified Farms	88	94	79	89	87	95
Small Dairy Farms	67	85	66	70	85	84
Medium Dairy Farms	-108	44	-9	-8	35	38
Large Dairy Farms[a]/	-247	105	N.S.	N.S.	N.S.	N.S.
	Percent of Labor Spent on Farm					
Small Diversified Farms	30	55	48	26	51	34
Small Dairy Farms	32	71	59	27	58	52
Medium Dairy Farms	51	58	52	50	57	62
Large Dairy Farms[a]/	79	97	N.S.	N.S.	N.S.	N.S.
	Major Farm Enterprise Changes Compared to 1986 Optimum Combination					
Small Diversified Farms	Decreased winter crops & beef	Increased beef	No Change	Decreased winter crops & beef	Increased beef	Decreased winter crops & beef
Small Dairy Farms	Decreased winter crops & milk cows	Increased milk product-ivity	Decreased milk cows	Dairy eliminated, increased beef	Decreased milk cows	Decreased milk cows
Medium Dairy Farms	Increased forage & milk cows, decreased wine	Increased forage & milk cows, decreased potatoes & wine	No Change	Increased forage & milk cows, decreased potatoes	Increased forage & milk cows, decreased potatoes	Increased forage & milk cows, decreased potatoes
Large Dairy Farms[a]/	Increased forage & milk cows, decreased potatoes & wine	Increased forage & milk cows, decreased wine	N.S.	N.S.	N.S.	N.S.

[a]/ The industrial employment alternatives were not simulated for the large dairy farms

available at the minimum agricultural wage. The next four columns report the results using the minimum industrial wage rate (15 percent higher than the agricultural wage rate) assuming: a) one full-time job, and b) unlimited industrial work provided an equal number of hours are worked each period.

Improved technology leads to an expansion in the output of forage and milk, with a reduction in the production of potatoes and wine. The impact of technology increases with farm size so this alternative alone is able to restore income on large farms to their 1986 levels. On the other hand, technology makes only a limited impact on the profitability of enterprises on small farms so they continue to allocate much of their labor to off-farm work. Adopting one off-farm industrial job per household at existing wages does not, however, improve income for those farms that already have unlimited employment in the farm sector. Even the alternative which offers more industrial employment, but requires that industrial work be evenly distributed throughout the year, does not resolve the income problem.

Low farm income is especially serious for the medium sized farms caught in a technological trap. On the one hand, dairying is the most profitable enterprise but even with technological change these farms cannot achieve a sufficient scale of operations to lower unit costs as do the large farms. On the other hand, medium farms have insufficient labor to earn enough off-farm wages to compensate for lower farm income. Additional simulations showed, however, that if these farms could succeed in renting out 400-500 hours of machinery services per year, they could achieve 1986 income.

CONCLUSIONS AND IMPLICATIONS

Farmers in northwest Portugal face a sharp decline in farm income when the country fully adjusts to EC farm product price levels by 1996. Medium and large dairy farms will likely experience negative net farm income because of their high levels of fixed costs associated with investments they were encouraged to make in recent years to modernize Portuguese dairying. Small farmers will face proportionately lower declines in family income because a large amount of their total labor supply must be employed off the farm. Projected 1996 product prices result in decreased production of winter crops, potatoes and wine.

Technological improvements currently available for the dairy, forage and field crop enterprises result in increased milk production in the optimum enterprise combinations for dairy farms. The value of this production on large farms is sufficient to fully restore the income lost due to price declines. Technological changes plus off-farm work in the agricultural sector can produce almost enough income on small diversified and dairy farms to compensate for their income loss. Medium dairy farms are caught in a squeeze, however. They do not have enough land to achieve the economies experienced by large farms as they adopt new technology. On the other hand, their family labor supply is largely employed in farm enterprises so they cannot earn as large amounts of off-farm wages as do small farmers. Therefore, medium farms will earn less than half of their 1986 family income even if they adopt new technology and have access to jobs paying the minimum wage. One alternative for some of these farms may be to utilize some of their excess machinery capacity to provide custom hire services to neighboring farmers with little or no owned equipment.

Industrial employment, although simulated at a 15 percent higher wage rate than agricultural work, does not provide the solution to low farm incomes if adequate agricultural work is available. One full-time industrial job per family actually lowers family income. Industrial work which exceeds the amount provided by one worker but requires an equal number of hours worked per period is also no better than unlimited farm work.

Some fairly clear directions emerge for agriculture in northwest Portugal. The future income and welfare of the smallest farmers will be extremely dependent upon their success in obtaining off-farm work, either in the agricultural or industrial sectors. Due to their small farm size, technological change in current farm enterprises is not an effective alternative to restore income lost due to commodity price declines. The overall impact of the EC on Portugal's industrial growth and the country's policies affecting industrial location, rural transportation and job training will be important in determining the off-farm employment success of small farmers. Welfare programs may be the only solution, however, for the oldest farmers who lack skills and employment potential. Large farms, on the other hand, have a large enough scale of operations to maintain their farm income through technological changes. The country's programs to speed the adoption of available technology may be adequate for this group of farms. The future success of medium size farms is closely linked to the future of the land and equipment market. These farmers must be able to rent or buy more land to get maximum benefit of the new technology and to spread their high fixed costs over more units of production.

Portugal is currently spending large sums of domestic and EC funds to modernize its agriculture. The future welfare of farmers in the northwest

will be influenced by how wisely these funds are spent. The country used massive amounts of credit and capital subsidies in the 1970s in earlier modernization efforts, but the impact of these subsidies is questionable (Mansinho, Graham and Meyer). Hopefully, the current efforts will have a greater payoff; otherwise these farmers that already are among the poorest in the country will face even greater poverty when Portugal is fully integrated into the EC.

FOOTNOTES

1. The wine produced in the region is the "vino verde" type which is consumed mostly in Portugal.

2. Special EC exchange rate used for conversion of agricultural prices.

3. A detailed description of all the models, the coefficients used for each activity, and the results for all simulations can be found in Henriques.

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